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ABSTRACT

This study investigates the cognitive nature of teacher-pupil questions in "process oriented" and "content oriented" secondary social studies programs. Subjects were five classes selected from a program viewed by both teachers and pupils as process-oriented; five from a program viewed by both teachers and pupils as content oriented. Ten hours of class discussion (five in each program) were audio-taped. Raters coded questions according to the Teacher-Pupil Question Inventory (TPQI). The TPQI has nine categories, seven of which are based on the Bloom taxonomy and the formulations of Sanders; the remaining two classifications, affective and procedural, include non-cognitive questions. Data obtained were treated by a mixed model ANOVA design. Data analysis showed: 1) No significant difference between programs in the mean numbers of questions asked. 2) Over-all, memory, interpretation, and procedure questions (lower level cognitive processes) were asked most frequently by both teachers and students. 3) The teachers asked three times as many questions as the students. 4) None of the interactions was significant. Further research is needed to ascertain why higher cognitive levels of questions in the process-oriented programs were not asked. (Author/DJB)

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COGNITIVE OBJECTIVES REVEALED BY CLASSROOM QUESTIONS IN "PROCESS - ORIENTED" AND "CONTENT - ORIENTED" SECONDARY SOCIAL STUDIES PROGRAMS

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Presented at the annual meeting of the American Educational Research Association, Minneapolis, Minnesota, March, 1970.

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Cognitive Objectives Revealed by Classroom Questions in "Process-Oriented" and "Content-Oriented" Secondary Social Studies Programs

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ABSTRACT

This study investigated the cognitive nature of teacher-pupil questions in "process-oriented" and "content-oriented" secondary social studies programs.

Subjects were five classes selected from a program viewed by both teachers and pupils as process-oriented; five from a program viewed by both teachers and pupils as content-oriented. Ten hours of class discussion (5 in each program) were audio-taped. Raters coded questions according to the Teacher-Pupil Question Inventory (TPQI). The TPQI has nine categories, seven of which are based on the Bloom Taxonomy and the formulations of Sanders; the remaining two classifications, affective and procedural, include non-cognitive questions. Obtained data were treated by a mixed-model ANOVA design.

Summary of Results:

1. No significant difference was found between programs in the mean numbers of questions asked.

2. Overall, memory, interpretation and procedure questions were asked most frequently by both teachers and students.

3. Overall, the teachers asked significantly more questions than did the students (about 3 to 1).

4. None of the interactions emerged as significant. These were: Questions Categories by Programs; Participants by Programs; Participants by Question Categories; Participants by Question Categories by Programs.

COGNITIVE OBJECTIVES REVEALED BY CLASSROOM QUESTIONS IN "PROCESS-ORIENTED" AND "CONTENT-ORIENTED" SECONDARY SOCIAL STUDIES PROGRAMS*

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One of the major goals of education in general and of the social studies in particular is the development of habits of thoughtful inquiry and sound decision-making in students. Attention in the social studies has long been directed toward instructional efforts to develop students' critical thinking abilities. Especially in recent years, many of these efforts have focused on discovery procedures in student-centered learning situations or "process-oriented" programs (Berman, 1968; Fair and Shaftel, 1967). In contrast to conventional or "content-oriented" programs which, traditionally, have tended to emphasize the acquisition of knowledge, learning how to use reliable knowledge effectively is a primary instructional goal for students in process-oriented social studies programs (Hunt and Metcalf, 1968; Fenton, 1966; Massialas and Cox, 1966).

Success in achieving instructional goals, however, is in part dependent on (1) effective communication of goals to and (2) substantive acceptance of goals by the students (Getzels and Thelen, 1960; Snygg, 1966). One recent study of content and process oriented secondary social studies programs (Sokol and Marshall, 1968; Watson, 1969) revealed that teachers and

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students in a process-oriented program agreed upon the general expectation of "teacher directed problem-solving, allowing for student participation and decision making." Both students and teachers in the content-oriented program tended to perceive the teacher as exclusive decision-maker with non-critical acceptance by students. Attention to the accumulation and utilization of facts was present in both programs, but in the process-oriented program the emphasis seemed to be upon the utilization of facts for problem-solving and decision-making. Recall of teacher-determined content was perceived by both teachers and students as an important factor in the content-oriented program.

Results of this study indicate that the general orientation for students and for teachers in these two programs was consistent: teacher-centered recall versus student-centered participation in problem-solving and decision-making. Furthermore, these findings suggest that instructional strategies in the two programs would be somewhat different. One such strategy, long viewed by teachers as one of the most important tools for developing knowledge and skills in thinking in students, is in the area of questions and questioning. Previous studies have focused on goal achievements in conventional and innovative social studies programs (Massialas, 1963), but more information concerning the range of cognitive objectives revealed by classroom questions in programs perceived by both students and teachers as having different goal expectations is needed.

This study, then, was designed to determine the cognitive nature of teacher-pupil questions in class discussions in content-oriented and process-oriented secondary social studies programs.

Procedures

Subjects were five classes from a program perceived by pupils and teachers as content-oriented; five from a program viewed by both teachers and pupils as process-oriented (Sokol and Marshall, 1968; Watson, 1969). The two schools from which these programs were selected were highly similar according to (1) comparative size and financial bases of the school and community, (2) quantitative educational effort, and (3) experience and stability of the teaching faculty (Sokol and Marshall, 1968; Watson, 1969).

Five one hour class periods of discussion in each of the two programs were audio-taped. Classroom questions were classified according to the Teacher-Pupil Question Inventory (TPQI) (Davis and Tinsley, 1966). Of the TPQI categories, seven were based on the Bloom Taxonomy and the formulations of Sanders (1966); two were non-cognitive. The categories were: memory, translation, interpretation, application, analysis, synthesis, evaluation, affectivity, and procedure.

Twenty individuals were trained for about twenty hours over a period of five weeks to code the questions. Teacher-pupil questions from each tape were classified by two independent raters from the group. The tapes were randomly assigned to the raters. Each rater classified the questions on one tape. In order to maximize the reliability of the classifications, combined ratings from the two raters on each tape were averaged to obtain composite sets of question classifications.

The rater reliability was determined by calculating the correlation coefficient between the two sets of question classifications for each tape. Using Fisher z transformations of the correlation coefficients, the expected

rater reliability coefficient was .976 and the 95% confidence interval was .923 to .992. As indicated by these statistics, the raters were highly consistent in their classifications of the questions from the tapes.

Results

The data were analyzed using a mixed model analysis of variance design. Three factors were established: programs, question categories, and participants (i.e., teachers and students). The latter two factors consisted of repeated measures within each classroom. The .05 level of significance was used for all statistical tests. The results of the analysis of variance are presented in Table 1. Corresponding means are presented in Table 2.

Table 1 about here.

Table 2 about here.

No significant difference was found between programs. The mean number of questions asked per class in the process-oriented and content-oriented programs were 43.50 and 48.90 respectively. The overall mean number of questions asked per class was 46.20.

None of the interactions between programs, question categories or participants were significant. These results indicate that the general pattern of questions asked by teachers and students were the same. This pattern did not differ between programs.

Significant differences were found among the mean number of questions asked in the various categories. Duncan's New Multiple Range Test was used to make paired comparisons following the significant analysis of variance (See Table 2). Significantly more memory questions (28.68%) were asked than these in any other category, followed by more interpretation questions (21.75%). More procedure questions (12.77%) were asked than either application (3.03%) or synthesis (2.38%). No other significant differences were found. In rank order, the mean number of questions asked per class in each category were: memory, 13.25; interpretation, 10.05; procedure, 5.90; analysis and evaluation, 4.50; affective, 2.90; translation, 2.60; application, 1.40; and synthesis, 1.10.

The difference between the mean number of questions asked by teachers and by students was significant. The respective means were 35.55 and 10.65, indicating that teachers asked about three questions for every one question asked by students.

Discussion

Although the school systems in this study were similar in several ways, certain aspects of the two social studies programs can readily be identified as being different. For example, the content-oriented program utilizes one teacher with one textbook in each class; the primary mode of presentation is lecture and/or class discussion. The process-oriented program employs cooperative teaching, integrated social studies and literature, and a special collection of material in lieu of one text. Besides class discussion, the

program also provides a variety of class experiences, e.g. role playing, large group instruction, small group projects. In addition, role perceptions of students and teachers indicate an emphasis on teacher-centered recall in the content-oriented program as opposed to student-centered participation in problem-solving and decision making in the process-oriented program.

However, to the extent that class discussion is representative of the entire program, the dominant emphasis on memory and interpretation questions in this study suggests that the cognitive objectives of the two programs are remarkably similar. In both programs, questions by teachers and their students, which may be related (Davis and Tinsley, 1967), failed to emphasize higher thinking processes. Although process-oriented teachers and students perceived their program as focusing on problem solving, certainly involving high level cognitive operations, only the lowest form of intellectual activity (Bloom, 1956) was incorporated as questioning behavior. It should be noted, however, that content-oriented teachers tended to ask more memory questions; their students more procedural questions. On the other hand, process-oriented students tended to ask more analysis and evaluation questions. Although these tendencies were not statistically significant, it could be hypothesized that if role perception is related to achieving the social studies objectives to foster critical thinking, consistency in the use of higher cognitive levels in asking questions and program orientation could be expected. Further research may serve to clarify this situation.

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TABLE 1

Analysis of Variance Summary Table

Source of Variance	SS	df	MS	F
Programs	4.0500	1	4.0500	---
Classes within Programs	77.1775	8	9.6470	
Question Categories	665.2750	8	83.1593	5.4929*
Question Categories X Programs	124.2750	8	15.5343	1.0260
Question Categories X Classes within Programs	968.9225	64	15.1394	
Participants	344.4500	1	344.4500	22.1927*
Participants X Programs	0.3555	1	0.3555	---
Participants X Classes within Programs	124.1670	8	15.5208	
Participants X Question Categories	100.8750	8	12.6093	1.3908
Participants X Question Categories X Programs	28.9195	8	3.6149	---
Participants X Question Categories X Classes within Programs	580.2330	64	9.0661	

*Significant at the .01 level.

TABLE 2

Means and Percentages of Questions Asked by

PROGRAM	PARTICIPANTS	LEVELS OF QUE									
		Memory		Translation		Interpretation		Application		Analys	
		M	%	M	%	M	%	M	%	M	
Process-Oriented (No. Classrooms = 5)	Teachers	7.00	*20.23*	3.30	*9.54*	5.90	*17.05*	1.30	*3.76*	4.90	*1*
	Students	2.70	*30.33*	0.50	*5.62*	2.00	*22.47*	0.00	*0.00*	1.30	*1*
	Total	9.70	*22.30*	3.80	*8.74*	7.90	*18.16*	1.30	*2.99*	6.20	*1*
Content-Oriented (No. Classrooms = 5)	Teachers	12.00	*32.88*	1.10	*3.01*	8.50	*23.29*	1.50	*4.11*	2.80	*7*
	Students	4.80	*38.71*	0.30	*2.42*	3.70	*29.84*	0.00	*0.00*	0.00	*0*
	Total	16.80	*34.35*	1.40	*2.86*	12.20	*24.95*	1.50	*3.07*	2.80	*5*
SUBTOTAL*	Teachers	9.50	*26.72*	2.20	*6.19*	7.20	*20.25*	1.40	*3.94*	3.85	*1*
	Students	3.75	*35.21*	0.40	*3.76*	2.85	*26.76*	0.00	*0.00*	0.65	*6*
OVERALL**		13.25	*28.68*	2.60	*5.63*	10.05	*21.75*	1.40	*3.03*	4.50	*9*

*Significantly more questions were asked by the teachers than by the students; means signific
**Using Duncan's New Multiple Range Test, the following mean differences were significant (α =
for memory, more interpretation questions than any other type; and more procedure questions th
and df = 64.

TABLE 2

centages of Questions Asked by Category

LEVELS OF QUESTIONS													
etation		Application		Analysis		Synthesis		Evaluation		Affect		Procedure		Total
%		M	%	M	%	M	%	M	%	M	%	M	%	Mean
17.05		1.30	*3.76*	4.90	*14.16*	2.00	*5.78*	4.40	*12.72*	1.30	*3.76*	4.50	*13.00*	34.60
22.47		0.00	*0.00*	1.30	*14.61*	0.00	*0.00*	1.30	*14.61*	0.80	*8.99*	0.30	*3.37*	8.90
18.16		1.30	*2.99*	6.20	*14.25*	2.00	*4.60*	5.70	*13.10*	2.10	*4.83*	4.80	*11.03*	43.50
23.29		1.50	*4.11*	2.80	*7.67*	0.20	*0.55*	3.20	*8.77*	2.70	*7.40*	4.50	*12.33*	36.50
29.84		0.00	*0.00*	0.00	*0.00*	0.00	*0.00*	0.10	*0.81*	1.00	*8.06*	2.50	*20.16*	12.40
24.95		1.50	*3.07*	2.80	*5.73*	0.20	*0.41*	3.30	*6.75*	3.70	*7.57*	7.00	*14.31*	48.90
20.25		1.40	*3.94*	3.85	*10.83*	1.10	*3.09*	3.80	*10.69*	2.00	*5.63*	4.50	*12.66*	35.55
26.76		0.00	*0.00*	0.65	*6.10*	0.00	*0.00*	0.70	*6.57*	0.90	*8.45*	1.40	*13.14*	10.65
21.75		1.40	*3.03*	4.50	*9.74*	1.10	*2.38*	4.50	*9.74*	2.90	*6.28*	5.90	*12.77*	46.20

by the students; means significantly different at .01 level, F = 22.19, df = 1,8.
fferences were significant (α = .05): more memory questions than any other type; except
and more procedure questions than either application or synthesis questions. SE = 1.20